The Claims Defining The Invention are as follows:

1. A method of monitoring the integrity of a structure disposed in an environment containing a fluid at an ambient pressure, said structure having at least one internal cavity, said method including at least the steps of:

providing a source of a first fluid at a first pressure greater than said ambient pressure;

placing said at least one cavity in fluid communication with said source; and

monitoring for a change in a steady state rate of inflow of said first fluid into said at least one internal cavity.

2. The method according to claim 1 wherein, said first fluid source pressure is substantially constant with respect to said ambient pressure.

3. The method according to claim 1 wherein, said monitoring step includes coupling a high fluid flow impedance in series between said at least one cavity and said source, to create a steady state differential pressure between said at least one cavity and said source, and monitoring for a change in said steady state differential pressure.

4. The method according to claim 1 wherein , said step of providing said first fluid source at said first pressure includes setting said first pressure at a level which is sufficiently greater than said ambient pressure to overcome hygroscopic force and capillary action, but not sufficient to be detrimental to the integrity of said structure.

5. The method according to claim 4 wherein, said step of providing said source of first fluid comprises providing a source of a first gas.

6. The method according to claim 5 wherein, said step of providing said first gas includes providing a moisture trap between said source and said at least one cavity to dry said gas prior to flowing into said at least one cavity.

7. The method according to claim 1 wherein, when said structure includes two or more internal cavities, said placing step includes one or both of (a) placing said internal cavities in fluid communication with each other; and (b) placing said cavities in fluid communication with said source.

8. The method according to claim 1 wherein, said monitoring step includes:

providing a supply of a fluid marker in fluid communication with said source; and

monitoring said structure for traces of said fluid marker.

9. The method according to claim 8 wherein, said fluid marker includes a dye indicating liquid or gas.

10. The method according to claim 1 wherein, said step of monitoring for a change in steady state inflow includes:

providing a supply of a detectable gas in fluid communication with said source;

providing a detecting means for said gas; and

monitoring for a change in a steady state rate of seepage of said gas from said structure.

11. A method of monitoring the integrity of a structure disposed in an environment containing a fluid at an ambient pressure, said method including the steps of:

forming a sealed cavity in said structure;

providing a source of a first fluid at a first pressure greater than said ambient pressure;

placing said at least one cavity in fluid communication with said source; and,

monitoring for a change in a steady state rate of inflow of said first fluid into said cavity.

12. The method according to claim 11 wherein, said step of forming said sealed cavity includes forming a recess or depression in or on said structure and forming a seal across said recess or depression.

13. A method for monitoring the integrity of a structure disposed in an environment containing a fluid at an ambient pressure, said structure being an ensemble of two or more components which are coupled together, said components juxtaposed relative to each other in a manner so that a surface of one component is adjacent to a surface of at least another one of said components to form respective adjacent surface pairs, said method including the steps of:

forming one or more cavities between one or more of said adjacent surface pairs;

providing a source of a first fluid and a first pressure greater than said ambient pressure;

placing at least one of said cavities in fluid communication with said source to produce at least one source pressure cavity; and

monitoring for a change in a steady state rate of inflow of said first fluid into said at least one source pressure cavity.

14 The method according to claim 13 further including the step of placing alternate ones of said cavities in fluid communication with said ambient pressure to produce adjacent interspersed source pressure cavities and ambient pressure cavities.

15. The method according to claim 14 further including the step of placing a moisture trap in series connection between said ambient pressure cavities and said environment or a source of said ambient pressure.

16. The method according to claim 13 wherein, said monitoring step includes coupling a high fluid flow impedance in series between said source pressure cavities and said source, to create a steady state differential pressure between said source pressure cavities and said source, and monitoring for a change in said steady state differential pressure.

17. The method according to claim 13 wherein, said monitoring step includes providing a supply of a fluid marker in fluid communication with said first fluid source and monitoring said structure for traces of said fluid marker.

18. The method according to claim 13 wherein, when said components of said structure, are coupled together by a layer of adhesive, or incorporate a layer of sealing material between said adjacent surface pairs, said forming step includes forming said cavities in said adhesive or sealing layer.

19. The method according to claim 13 wherein, where said components are coupled together by mechanical fasteners, said forming step includes providing a seal about said adjacent surface pairs to form said cavities between said adjacent surface pairs.

20. An apparatus for monitoring the integrity of a structure disposed in an environment containing a fluid at an ambient pressure, said structure having at least one internal cavity, said apparatus including at least:

a source of a first fluid at a first pressure greater than said ambient pressure;

a communication channel for providing fluid communication between said source and said at least one cavity; and

monitoring means for monitoring for a change in a steady state rate of inflow of said first fluid through said channel into said at least one internal cavity.

21. The apparatus according to claim 20 wherein, said monitoring means includes a high fluid flow impedance disposed in said channel in series between said at least one cavity and said source, said high fluid flow impedance creating a steady state differential pressure between said at least one cavity and said source, and transducer means coupled across said high fluid flow impedance for monitoring for a change in said steady state differential pressure.

22. The apparatus according to claim 20 wherein, said first pressure is sufficiently greater than said ambient pressure to overcome hygroscopic force and capillary action but not sufficient to be detrimental to the integrity of said structure.

23. The apparatus according to claim 20 wherein, said first fluid is a gas.

24. The apparatus according to claim 23 further including a moisture trap located between said source and said at least one cavity to dry said gas prior to flowing into said at least one cavity.

25. The apparatus according to claim 20 wherein, said monitoring means includes a fluid marker in communication with said source for marking said structure at locations where said fluid permeates from said cavity through said structure to said environment.

26. A method of inhibiting the ingress of a target fluid into a structure disposed in an environment containing said target fluid at an ambient pressure, said structure having at least one internal cavity, said method including the steps of:

providing a source of a first fluid at a first pressure greater than said ambient pressure; and

providing a fluid communication path between said at least one internal cavity and said source.

27 The method according to claim 26 further including the step of monitoring for a change in a steady state rate of inflow of said first fluid into said at least one internal cavity thereby facilitating the monitoring of the integrity of said structure.

28. An apparatus for preventing the ingress of a target fluid into a structure disposed in an environment containing said target fluid at an ambient pressure, said structure having at least one internal cavity, said apparatus including at least:

a source of a first fluid at a first pressure greater than said ambient pressure; and

one or more communication channels for providing fluid communication between said source and said at least one cavity.